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vania, and of the Carboniferous Formation throughout the United States. It will be invaluable to all those who wish to identify coal plants, as 260 species are figured.—The *Botanical Gazette* contains a note on the influence of the scion on the stock, by T. Meehan, with a number of other notices.—Trimen's *Journal of Botany* prints a note on the morphology of the Characeæ, by S. H. Vines.

ZOÖLOGY.¹

HABITS OF THE RED-HEADED WOODPECKER.—During the past three or four years much has been written in regard to the changes which are taking place in the habits of the red-headed woodpecker—"a versatile bird," to quote the apt characterization of Dr. Elliott Coues. This bird is quite common here, though I am of the opinion that it is not seen in as large numbers as it was when the country was first settled, some twenty-two years ago. I have often seen them about my barn-yard industriously picking up corn which had been shelled for the swine. Generally the bird alights and secures a single grain, and then flies off to the nearest tree-top to peck it into pieces and devour it at his leisure, returning for others at frequent intervals. I have often watched them while they were making a score of these little journeys. In 1877 this region was overrun with grasshoppers, upon which the red-headed woodpeckers feasted royally while they lasted. I saw the birds out on the prairie, a mile or two from the timber, so intent upon catching the 'hoppers that they scarcely noticed one in passing. Sometimes they would catch a 'hopper on the wing, dodging around in a very lively manner to secure the insect, and again they would hunt for their prey on the ground. The insect secured, the bird would alight on a fence-post and devour it. I have occasionally seen them, attended by their progeny, in the open fields, where the old birds were engaged in catching insects for the clamorous younglings, which had not yet learned to provide for themselves. It would seem that, at the time the young birds require so much food, the old ones would need some readier means of supply than would be afforded by pecking for grubs in decayed timber, or searching for insects on the outside of trees—whether the "creepers" had intruded upon their domain or not. So far as I have been able to observe, the red-headed woodpecker is really a very "versatile bird," evincing a readiness of resource and an easy adaptation to his environment that are truly wonderful.—*Chas. Aldrich, Webster city, Iowa.*

FISH NOTES FROM THE PACIFIC COAST.—Several fine carp were caught recently in Sonoma creek, one of which weighed nearly eight pounds. They are said to bite like a trout and to make a good fight. Young catfish which were placed in Clear lake,

¹The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A.

Lake county, last fall, and which at that time measured from one to three inches in length, are found to have grown rapidly; some have been caught within a few weeks that measured ten inches. Sturgeon fishing or spearing is being pursued extensively, as reported, in the Mokelumne river, at Athearn's ford. It is a quite frequent occurrence to capture specimens weighing from fifty to one hundred pounds.

The young trout with which the streams of Santa Cruz county have been stocked are natives, coming from the McCloud river. This species is regarded as the most vigorous, and frequently attains the weight of five pounds. It is said to have a growth of ten inches in one year. It is reported that the Commissioners in charge of the Yo Semite valley have decided to plant the McCloud river trout in the streams of the Yo Semite reservation. The experiments with the brook trout of the Atlantic States in the streams of the coast range, have not been satisfactory; this is owing, quite likely, to two causes: first, too high a mean temperature in the waters of said streams; and second, through the impurities they contain, which must be especially obnoxious to so dainty a fish during the fall months when the streams are low, muddy and warm, and the water flavored more or less by the bituminous shales through or over which they frequently flow, and out of which ooze numerous small springs, often covered with an oily slime or scum. Experiments with eastern trout are much more likely to meet with success in the loftier regions of the Sierra Nevada, in the clear cold waters of a granitic formation, nearer the line of almost perpetual snow.

Santa Cruz fishermen sometimes catch a few mackerel and shad in the neighboring waters of the bay. The former are a native, the latter an introduced fish, but yet scarce. For some reason the mackerel do not strike in toward the shore to any considerable extent. In consequence of this, the few that are sent to the San Francisco market are sold at fancy prices.

Salmon commenced running in Puget Sound about the 25th of March.—*Robt. E. C. Stearns.*

NOTES ON THE APPLE-WORM.—Mr. J. Savage, of Lawrence, Kan., in a recent number of Colman's *Rural World* remarks upon the freedom of Michigan apples from the work of the apple-worm (*Carpocapsa pomonella*). This same freedom was generally noticed in 1878, not only in Michigan but in many parts of New York, and it doubtless obtained elsewhere. It will be well for us to endeavor to arrive at the reasons. To my mind the following, first stated by me in the New York *Tribune*, may very properly be urged: 1st. The very general failure of the apple crop in 1877, as exemplified in the reports for that year, which we find both in the Proceedings of the Michigan Pomological Society and in those of the American Pomological Society. This failure

was in many localities so nearly total that scarcely any apples were grown, and it follows, as a consequence, that very few codling moths were produced to perpetuate the species the following year. A second reason, so far as Michigan is concerned, may be found in the fact that in no State in the Union have more intelligent and persevering efforts been made to prevent its ravages. Through the columns of the agricultural and horticultural journals as well as in the pages of their pomological transactions, the simple methods of fighting this pest that have been reported and recommended in the Missouri reports have been persistently kept before the people, while Prof. Beal, of the Agricultural College, has, perhaps, done more good than any one else by showing that it cost him no more than four cents per tree to keep the bands around the trunks, changing them every nine days in the warm months, from the first appearance of the worms until the end of August, in an orchard of two hundred and fifty trees. I agree with him when he asserts that "if a man will not take the trouble to keep his fruit from the worms, he deserves to eat wormy apples."

Missouri apple growers should take courage from these facts. Since my connection with the Department of Agriculture there have been sent to me four different kinds of patent bandages to be used as traps for this apple-worm, but I can find no advantage in any of them over the simple paper bandages first recommended by me in 1872, and since very generally employed.—*Prof. C. V. Riley before the Mo. State Hort. Soc., 1879.*

DOES THE SNOWY OWL BREED IN THE UNITED STATES?—The snowy owl (*Nyctea nivea*) is a common winter visitant, near Chicago. It frequents the haunts of rabbits and various members of the grouse tribe. On the borders of Lake Ontario, in the great wooded marshes, these birds find thousands of rabbits roaming in night time in the frozen tracts. They are caught here in large numbers, and the author recalls the capture of fifteen of these during the winter of 1875, near Mexico, New York. The manner in which they are captured is of no little interest. During the day they take to the open lots adjoining the marshes, but in the night ravage the woods. They are seldom known to leave the small area selected for their depredations, unless driven away. In the day area they have but three or four places on which they alight, and when they are disturbed are sure to fly to one or other of these places, often moving in a circuit for hours. A high stake being placed in the center of the open lot, and a small steel-trap placed thereon they will speedily take to the stake in preference to other resorts, and are consequently caught. No bait is placed in the trap, the bird being caught by making simple use of the peculiarity of their habits. Their white plumage gives them the appearance of the snow beneath them, so that they may

dart swiftly on their prey, almost unperceived. There is a matter regarding the snowy owl in which ignorance of their habits or scientific assumption must predominate. The assumption is that they are strictly boreal, or Arctic, in their breeding habits. Many farmers, however, along Lake Ontario assert they are seen there during the entire year, and there is consequently a belief among them that they breed there. In the "North Woods" of New York the author once saw a young snowy owl—not nearly full fledged—shot by a hunter in early spring. The hunter persisted that the bird was one of several young seen by him in proximity to each other. I am not yet prepared to believe that they breed in that latitude, but record the current opinions for the use of any one who may investigate the matter fully.—*W. H. Ballou.*

DOUBLE-HEADED SNAKES.—In the *AM. NATURALIST* (Oct., 1878, p. 694), the essay on the Natural History of Guiana (1769) should have been credited to Edward Bancroft whose name stands at the end of the dedication. The monstrous snake of Lake Champlain with two heads side by side seems to be of an unknown species, judging from the doubtful checker-board spots, although it is compared with "the rattle-snake." Here "amphisbæna" is a misnomer, as the name implies the ability to go in both directions (forward and backward), a power possessed by these laceratians, both ends having nearly the same shape.—*S. S. Haldeman.*

AMIA CALVA.—We have received a letter from Jacob Stauffer, of Lancaster, Pa., in which he states that a specimen of *Amia calva* has recently been taken in the Susquehanna river, below Safe Harbor, and is now preserved in the Linnæan Society of Lancaster. This is the first definite account of the existence of this species in the Susquehanna, though as pointed out by Mr. Stauffer, DeKay had suspected it. Mr. Stauffer calls attention to the pouch enclosed between the sub-lingual bone and the throat of this fish, which has been little or not at all noticed by writers.

HABITS OF ANTS.—In the sixth part of Sir John Lubbock's *Observations on the habits of Ants, Bees and Wasps*, the author shows that the hairs of plants keep insects from climbing up the stalks, as he believes, to prevent them from obtaining access to the flowers, and from robbing them of their honey. He also confirms Denny and Lespes' statement that workers ants are capable of laying eggs, and Forel and Dewitz's discovery that the eggs produce males, stating that he has bred in his nests "a large number of males;" thus, as in bees, the fertile workers can produce males only. That ants may live three or four years, and that in some nests 100,000 individuals may be by no means an unusual number, is also stated. Many facts regarding the recognition of friends are stated, indicating that "ants of the same nest do not recognize one

another by any password. On the other hand, if ants are removed from a nest in the pupa state, tended by strangers and then restored, some at least of their relatives are certainly puzzled, and in many cases doubt their claim to consanguinity. I say some, because while strangers, under the circumstances, would have been immediately attacked, these ants were in every case amicably received by the majority of the colony, and it was sometimes several hours before they came across one who did not recognize them." Lubbock believes that ants produce sounds, and alludes to a letter in *Nature* for December, from Mr. T. S. Tait, who writing from Baroda, says that by means of the microphone "we have been able to hear the roar [sic] of a black ant when attacked by its companion." Lubbock adds that "Prof. Bell most kindly set up for me an extremely sensitive microphone; it was attached to the under side of one of my nests, and though we could distinctly hear the ants walking about, we could not distinguish any other sound. It is, however, far from improbable that ants may produce sounds entirely beyond our range of hearing; indeed it is not impossible that insects may possess senses, or rather sensations, of which we can no more form an idea than we should have been able to conceive red or green if the human race had been blind. The human ear is sensitive to vibrations reaching to 38,000 in a second. The sensation of red is produced when 470 millions of millions of vibrations enter the eye in a similar time; but between these two numbers vibrations produce on us only the sensation of heat; we have no special organs of sense adapted to them. But there is no reason in the nature of things why this should be the case with other animals; and the problematical organs possessed by many of the lower forms favor the suggestion. If any apparatus could be devised by which the number of vibrations produced by any given cause could be lowered so as to be brought within the range of our ears, it is probable that the result would be most interesting."

He also relates an anecdote of the kind treatment, by its fellows, of an ant born without antennæ, adding, "It would have been difficult for any one who witnessed this scene to have denied to this ant the possession of human feelings." On the other hand when an ant is fighting with one of another species, her friends rarely come to her assistance. "They seem generally (unless a regular battle is taking place) to take no interest in the matter, and do not even stop to look on."

Rev. Mr. McCook, of Philadelphia, author of a recent work on the agricultural ant of Texas, states that the mandibles of ants are worn off and become blunted by the labor which they perform. His observations have been confirmed by Mr. E. P. Austin from the examination of the mandibles of nearly a hundred specimens of a ground beetle (*Pasimachus*). Mr. McCook early in July went to Colorado and New Mexico for the purpose of

studying the habits of the mound ant, *Pogonomyrmex occidentalis*, a common and characteristic ant of the Western plains.

A POISONOUS CENTIPEDE.—Last winter I discovered a living *Cermatia forceps* in wrapping paper in my house in Providence, R. I. It is possible that it came in a bundle from Princeton, N. J., and was not a native Rhode Islander. The *Cermatia* is the most highly developed of all Myriopods; has long sprawling legs, and is greenish-brown in color. It has not before been known to exist north of Philadelphia, and has been found there to be useful in destroying insects and spiders.—*A. S. Packard, Jr.*

ANTHROPOLOGY.¹

MASTODON, MAMMOTH AND MAN.—The Rev. J. P. Maclean is the author of a small work published in Cincinnati, and entitled "Mastodon, Mammoth and Man." The interest in the public mind concerning the contemporaneity of man with the mastodon and mammoth, and the inaccessibility of reliable information on the subject, induced the author to compile this work. The subject of the great antiquity of these animals is not treated here, having been discussed more fully in the author's work entitled "A Manual of the Antiquity of Man." Part first of the volume now before us relates to the mastodon; part second to the mammoth, and part third to man. In the last chapter are brought together all the instances in which human bones or implements are alleged to have been found in conjunction with remains of the mastodon or the mammoth.

ARCHÆOLOGY AT ST. LOUIS AND PHILADELPHIA.—In the St. Louis loan exhibition the department of archæology was well represented from the collections of Dr. George Engelmann, Messrs. F. M. Perrine, M. S. Mephram, John H. Henderson, J. T. Snyder, F. F. Hilder, C. Croswell, A. J. Conant, Dr. Patrick, J. C. Zimmer and the collection of the St. Louis Academy of Sciences. Those who had the opportunity of enjoying the hospitality of these gentlemen at St. Louis, last summer, will remember the great beauty and value of some of these private collections. It makes one shudder to think how much precious material may be sported away at the mercy of a single friction match. Cannot some plan be devised by which a gentleman of taste and means may indulge in the luxury of a private collection in a fire-proof building, so arranged that the public may enjoy the sight of it without trenching on private hospitality?

On the heels of the foregoing announcement comes a pamphlet from our friend, Mr. E. A. Barber, number five of the Official Bulletin of the International Exhibition, Fairmount Park, Philadelphia, giving a full description of the department of archæology and ethnology, under his charge. "It is proposed also to estab-

¹Edited by Prof. ORIS T. MASON, Columbian College, Washington, D. C.